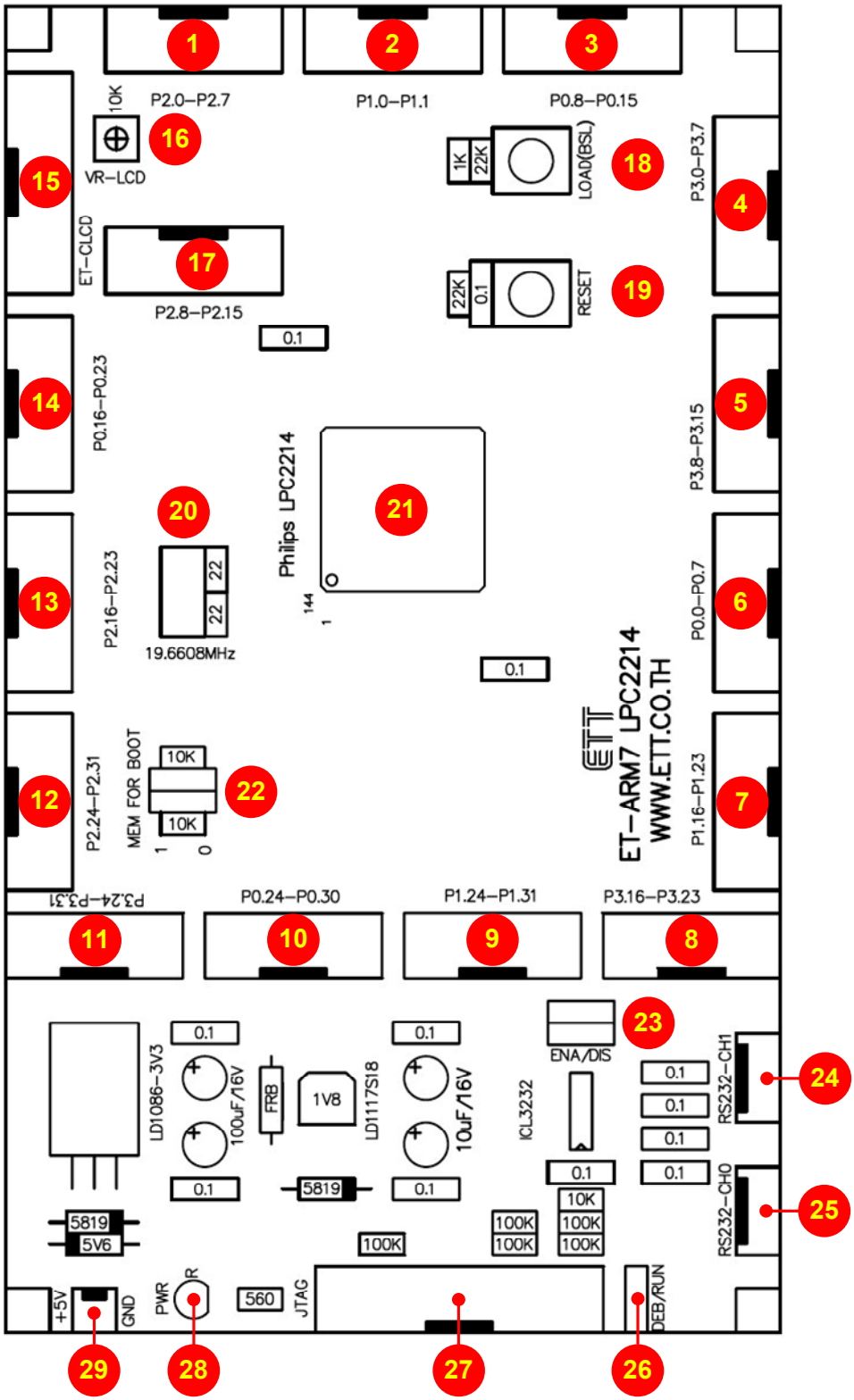
ET-JR ARM7 LPC2214 Development Board

ET-JR ARM7 LPC2214 which is a Microcontroller Board ARM7TDMI-S Core uses Microcontroller 16/32-Bit 144 PIN. There's many I/O and it uses MCU No.LPC2214 from PHILIPS to be permanent MCU on Board. Structure of board is designed to arrange I/O PORT as 10 PIN type of ETT, so it is so convenient to truly application and it is arranged with basic components such as Connector Power Supply +5V, UART (RS232) Connector 2 Port for downloading Hex File and RS232communication of written Program Application, LCD PORT, JTAG Connector. Moreover, GPIO can support signal 5V.

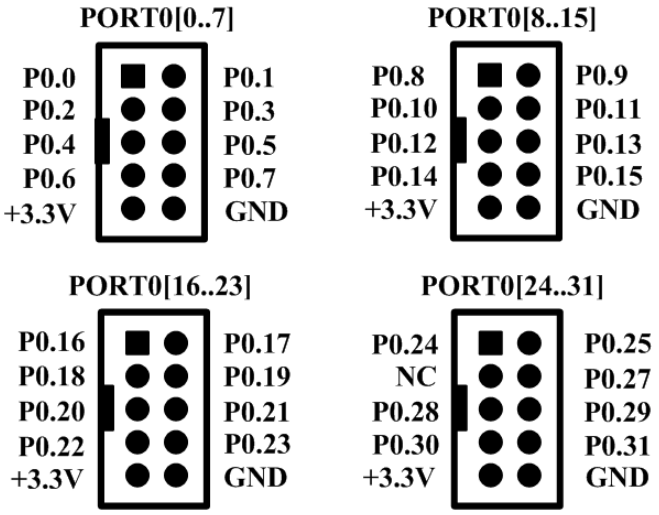
Specifications

1. 16/32-Bit MCU ARM7TDMI-S No.LPC2214 from PHILIPS
2. Crystal 19.6608 MHz can be collect data maximum high speed 58.9824 MHz when using with Phase-Locked Loop (PLL) internal MCU
3. Support In-System Programming (ISP) and In-Application programming (IAP) through On-Chip Boot-Loader Software via Port RS232-CH0
4. 1 Port JTAG 20 Pin for Real Time Debugging
5. 1 Port LCD 14 Pin standard ETT
6. 16 Port GPIO 10 Pin standard ETT
7. 256KB FLASH Memory and 16KB RAM (with External Memory Interface)
8. VIN +5V Power Supply
9. Maximum GPIO 112 I/O Pins (Only GPIO supports signal 5V)GPIO Pins can be used with other functions as follows;
   - 2 Channel SPI, 1 Channel I2C, 8-Channel 10 Bit A/D Converter (0V-3.3V only)
   - UART Full Duplex 2 Channel; RS232-CH0, RS232-CH1 standard 4 Pin ETT to be RS232 signal level
   - Timer 32-Bit 2 Channel (4 input Capture / 4 Output Compare), Watchdog Timer, Real Time Clock, PWM 6 Output

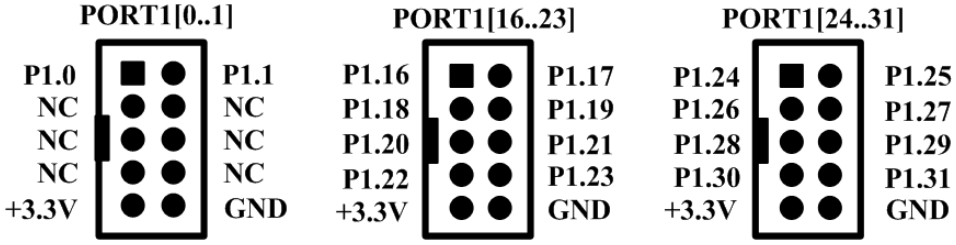
Structure of Board ET-JR ARM7 LPC2214



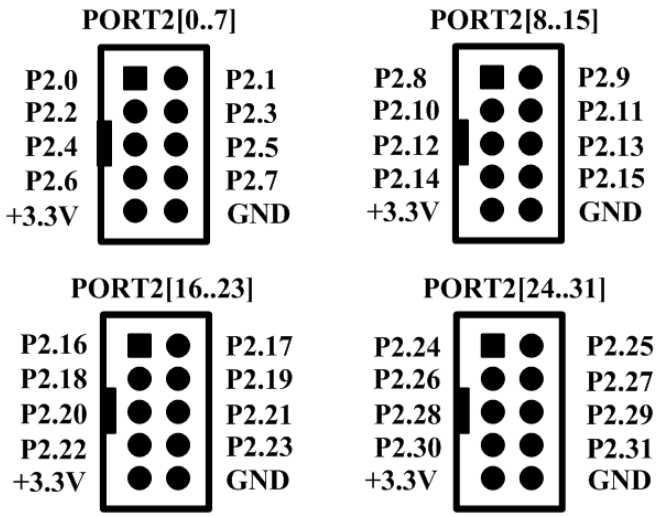
- **No. 6, 3, 14** and **10** is GPIO that is divided into 4 Ports as in the picture (only GPIO can support signal 3.3V and 5V).



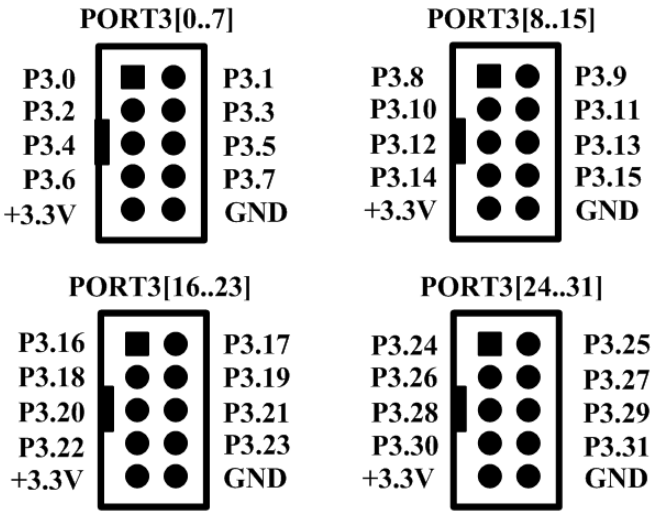
- **No. 2, 7** and **9** is GPIO that is divided into 3 Port as in the picture (only GPIO can support signal 3.3V and 5V).



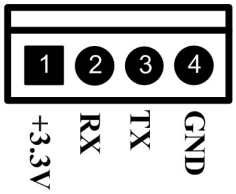
- **No. 1, 17, 13** and **12** is GPIO2 that is divided into 4 Port as in the picture (only GPIO can support signal 3.3V and 5V).



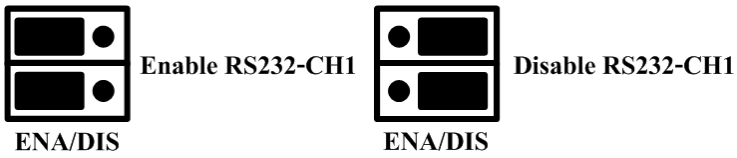
- **No. 4, 5, 8** and **11** is GPIO3 that is divided into 4 Port as in the picture (only GPIO can support signal 3.3V and 5V).



- **No. 24** and **25** is Port Communication RS232-CH0 and RS232-CH1 respectively.

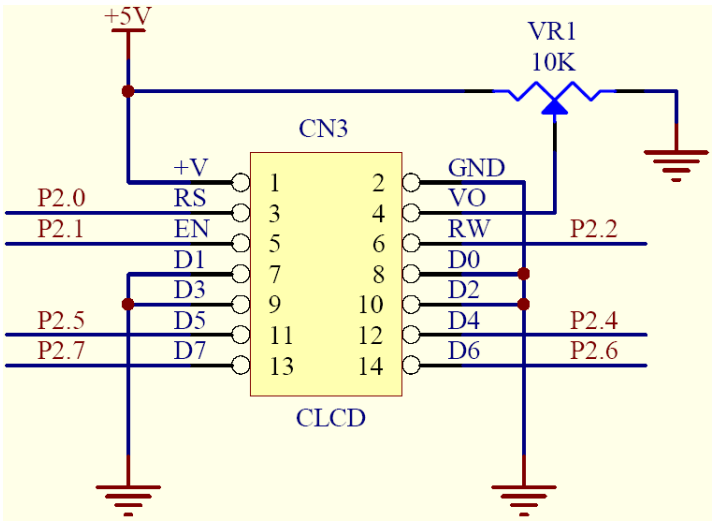


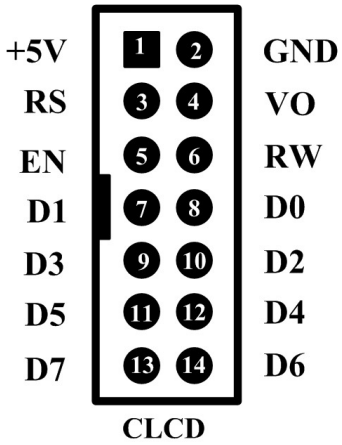
- **No. 23** is Jumper for Enable or Disable RS232-CH1.



- **No.18** and **19** is Switch LOAD (BSL) and RESET respectively.

- **No. 15** and **16** is LCD Connector 14PIN and VR10K to contrast the brightness of LCD Monitor respectively.





- **No. 20** is Crystal 19.6608 MHz.

- **No. 21** is MCU ARM7TDMI-S LPC2214 from Philips.

- **No. 22** is Jumper for selecting internal Memory or external Memory to Boot. For this Board, we set as 11 that use internal Flash Memory to be default value.

00 Select 8-bit memory on CS0 for boot.

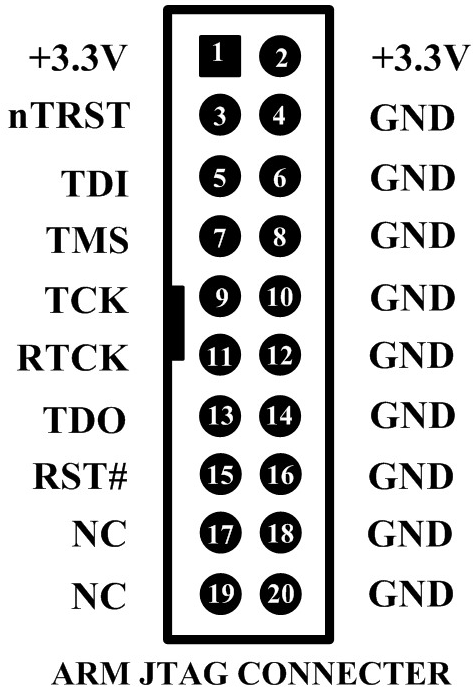
01 Select 16-bit memory on CS0 for boot.

10 Select 32-bit memory on CS0 for boot.

11 Select Internal Flash memory for boot.

- **No. 26** is Jumper for selecting RUN Mode or Debugging Mode.

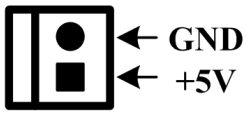
- **No. 27** is JTAG Connector 20PIN to Interface with JTAG Debugger.



ARM JTAG CONNECTER

- **No. 28** is red LED to display operation of Power Supply.

- **No. 29** is connecting point of +5V Power Supply for board and GND.

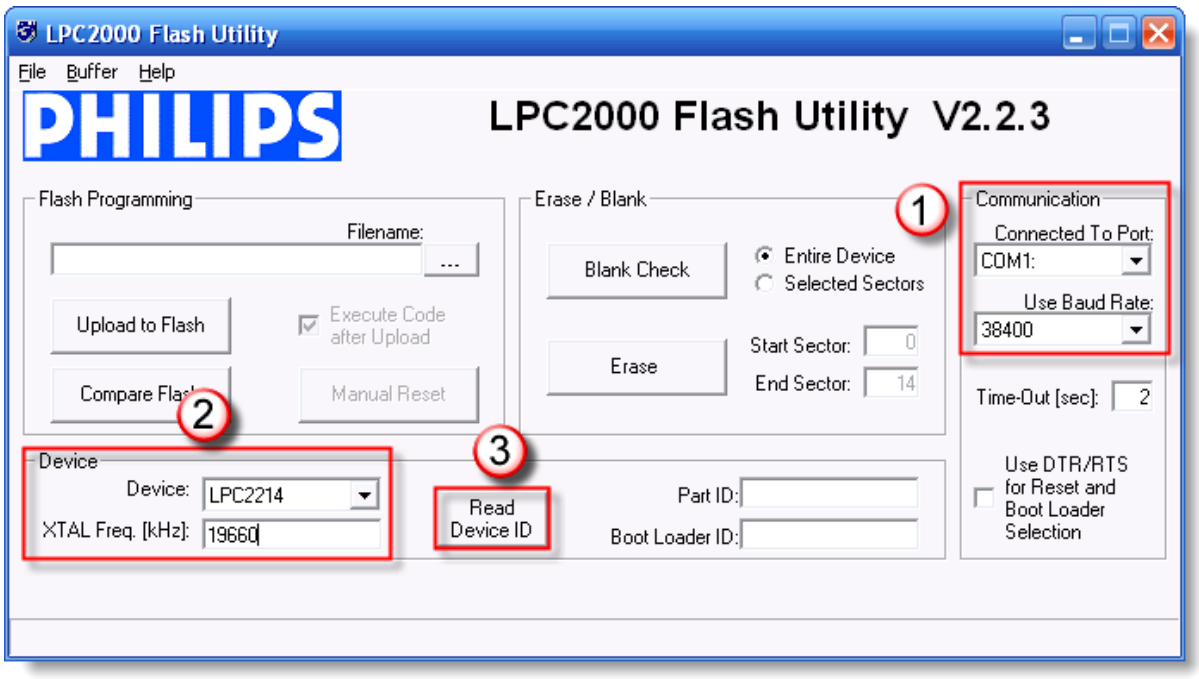


Download Hex File into MCU of Board

To download Hex file into Flash memory of MCU internal Board, we use program LPC2000 Flash utility V2.3.3 from Philips. It connects with MCU through Serial Port of computer PC and we can download this program free without any charge from website www.semiconductors.philips.com

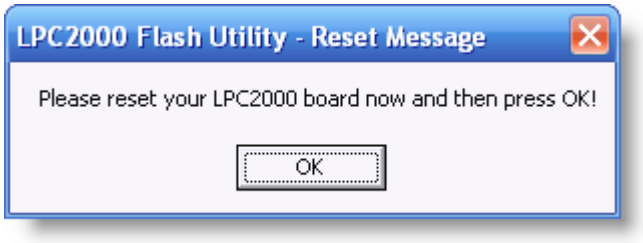
Procedure to Download Hex File into MCU

1. Interface Cable RS232 from RS232 Serial Port Communication of PC with Board (RS232-CH0)
2. Set Jumper RUN/DEB to be on RUN Mode side
3. Power Supply +5V into Board and see red LED (PWR) must be status ON
4. Run Program LPC2000 Flash Utility of Philips and it will display results as in the picture below
5. Start setting default values of Program into Board ET-JR ARM7 LPC2214 from ETT; in this case, user should set default values as in the picture below;

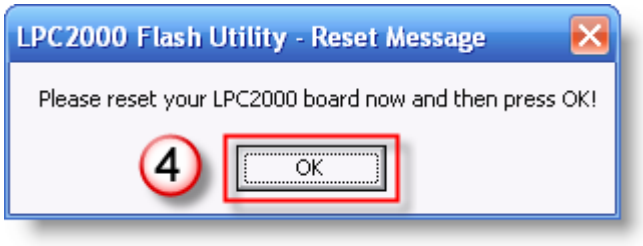


1) Must select Com Port to be corresponding with Com Port number that is truly usage (in this example uses COM1)
2) Set Baud Rate between 4800 - 38400 (these values are tested, so user can use them without any problem)or using standard speed that is 9600
3) We can not select MCU in Device blank because program will display number of LPC2214 by self (depend on permanent MCU of board) when it can be connected with Board successfully.
4) Set Crystal Oscillator to be corresponding with truly usage internal Board with KHz unit and not use greater than 5 digits. In this case, we set it as 19.6608 MHz or 19660.

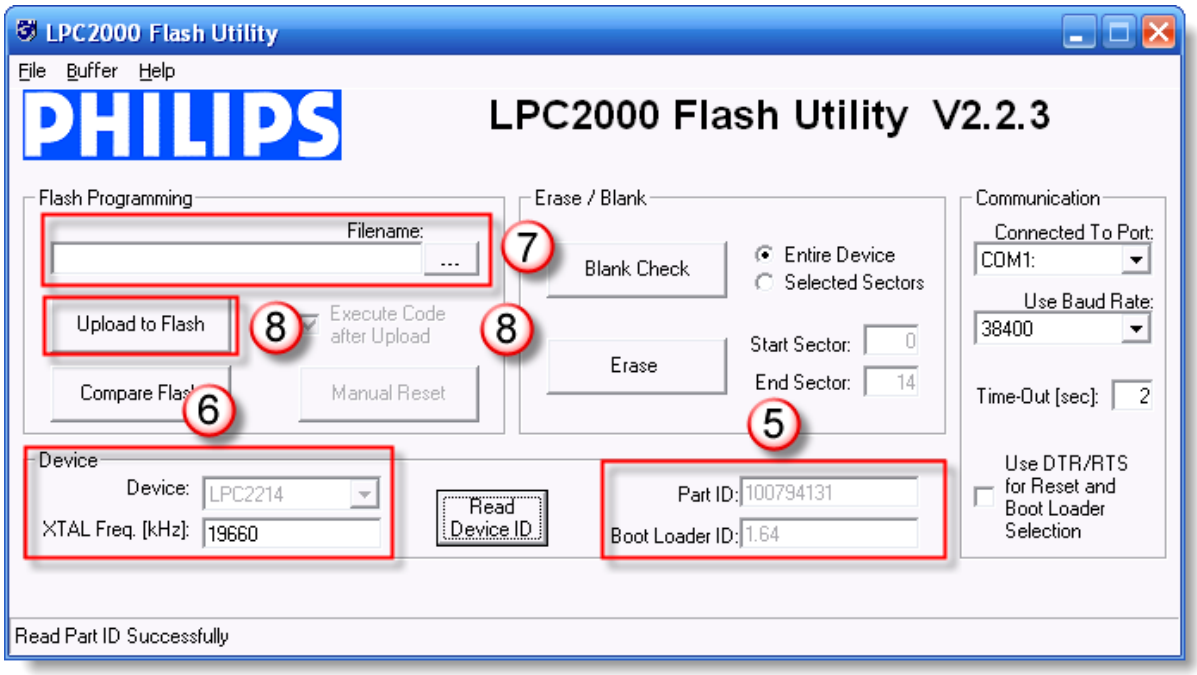
5) Click **"Read device ID"** button to connect with CPU and it will display message to access into Boot Mode as in the picture below.



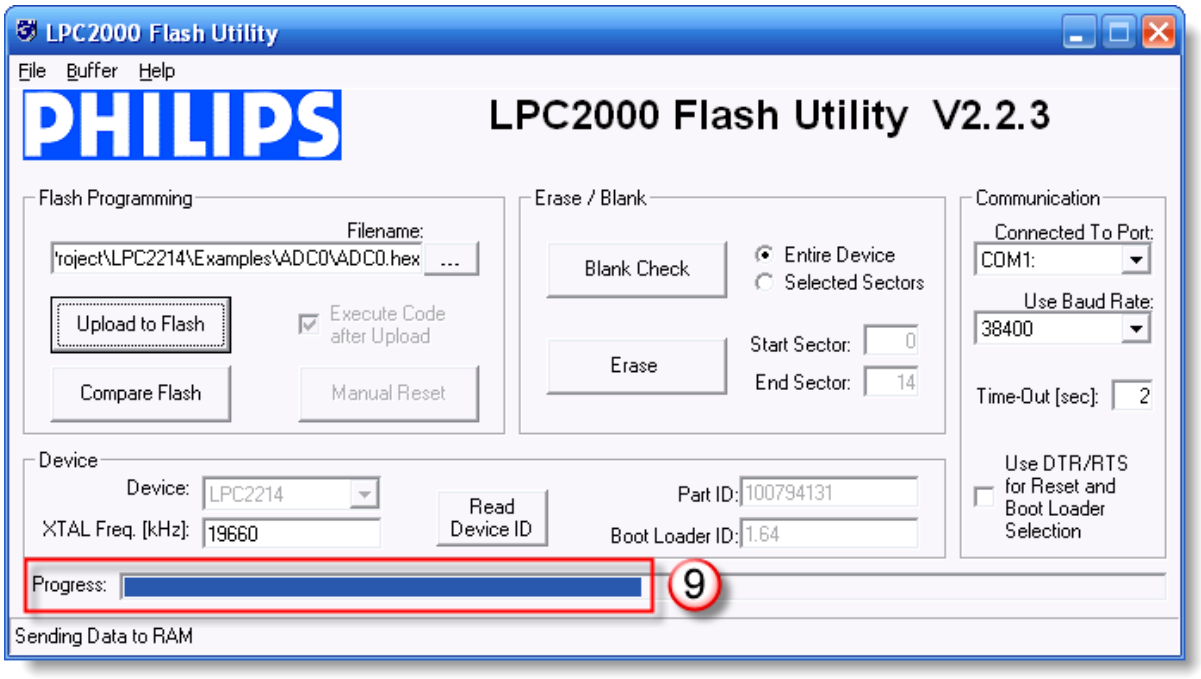
6) Press Switch RESET and LOAD (BSL)on Board ET-JR ARM7 LPC2214 to Reset MCU to run in Boot Loader Mode as in the procedure below;
   - Press Switch LOAD (BSL) for a while
   - Press Switch RESET but we remain pressing Switch LOAD (BSL)
   - Let Switch RESET but we remain pressing Switch LOAD (BSL)
   - Finally, let Switch LOAD (BSL)and then click "OK"



7) When it can connect with CPU successfully, it will display detail of Part ID and Boot Loader ID as in the picture below.

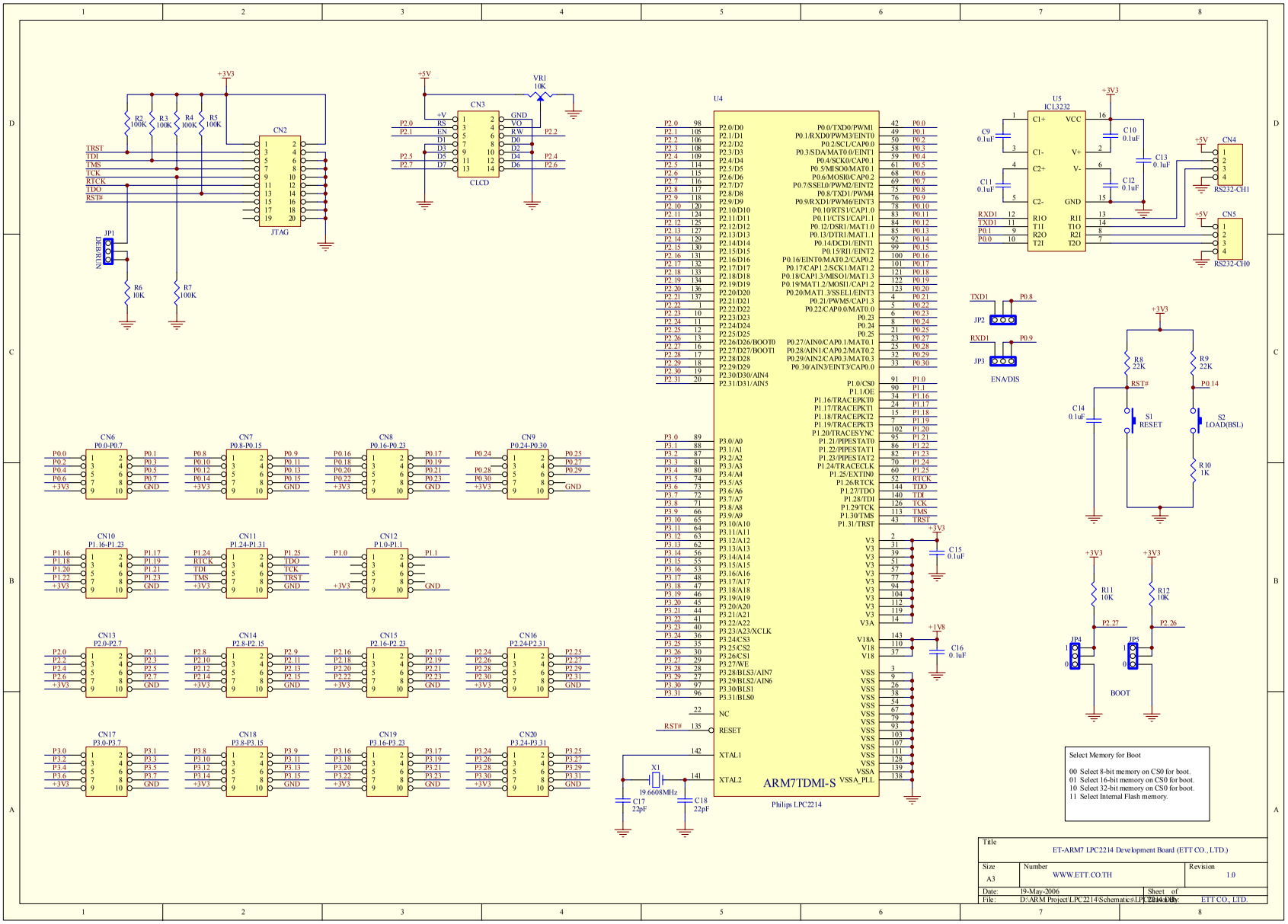


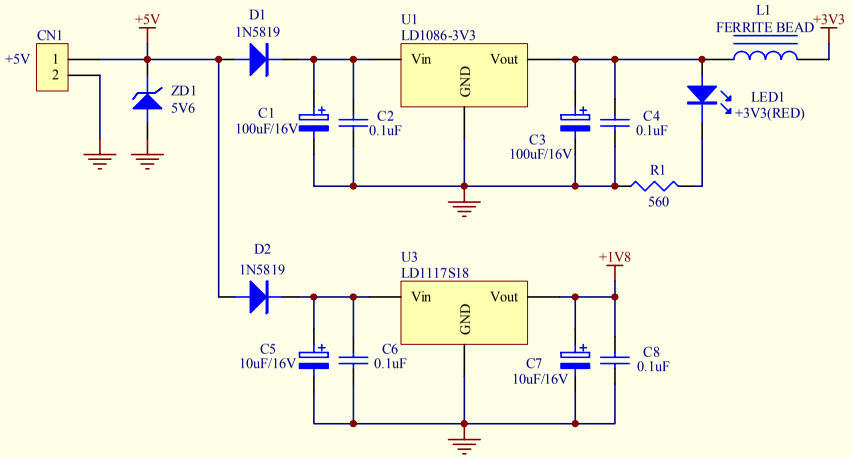
8) Then select HEX File that we want programming into MCU
9) Click **"Upload to Flash"** and program LPC2000 starts downloading data into MCU instantly. We can see Status **"Uploading to LPC2000 RAM and Copying to Flash Memory"** as in the picture below. We must wait for this proceeding completely and we can see Status **"File Upload Successfully Completed"**



10) When the operation of program completely, must press Switch RESET on Board and MCU starts running follow downloaded program instantly.

ETT CO., LTD
1112/96-98 Sukhumvit Rd., Phrakanong, Bangkok 10110 THAILAND
Tel : (662) 712-1120 Fax : (662) 3917216
E-Mail : sale@etteam.com
Website : www.ett.co.th, www.etteam.com


+3V3
R2 100K
R3 100K
R4 100K
R5 100K
CN2
TRST
TDI
TMS
TCK
RTCK
TDO
RST#
JTAG
JP1
DEBRUN
R6 10K
R7 100K
+5V
VR1 10K
CN3
GND
VO
RW
D0
D2
D4
D6
RS
EN
D1
D3
D5
D7
P2.0
P2.1
P2.2
P2.4
P2.5
P2.6
P2.7
CLCD
U4
ARM7TDMI-S
Philips LPC2214
U5
IC1232
C1+
C1-
C2+
C2-
VCC
V+
V-
GND
R1O
T1I
T1O
R2O
T2I
R1I
R2I
T2O
C9 0.1uF
C10 0.1uF
C11 0.1uF
C12 0.1uF
C13 0.1uF
CN4
CN5
RS232-CH1
RS232-CH0
RXD1
TXD1
P0.1
P0.0
JP2
JP3
ENA/DIS
P0.8
P0.9
R8 22K
R9 22K
RST#
P0.14
C14 0.1uF
S1
RESET
S2
LOAD(BSL)
R10 1K
R11 10K
R12 10K
P2.27
P2.26
JP4
JP5
BOOT
C15 0.1uF
C16 0.1uF
+1V8
X1
19.6608MHz
C17 22pF
C18 22pF
CN6
P0.0-P0.7
CN7
P0.8-P0.15
CN8
P0.16-P0.23
CN9
P0.24-P0.30
CN10
P1.16-P1.23
CN11
P1.24-P1.31
CN12
P1.0-P1.1
CN13
P2.0-P2.7
CN14
P2.8-P2.15
CN15
P2.16-P2.23
CN16
P2.24-P2.31
CN17
P3.0-P3.7
CN18
P3.8-P3.15
CN19
P3.16-P3.23
CN20
P3.24-P3.31
GND
Select Memory for Boot
00 Select 8-bit memory on CS0 for boot.
01 Select 16-bit memory on CS0 for boot.
10 Select 32-bit memory on CS0 for boot.
11 Select Internal Flash memory.
Title
ET-ARM7 LPC2214 Development Board (ETT CO., LTD.)
Size
A3
Number
WWW.ETT.CO.TH
Revision
1.0
Date:
19-May-2006
Sheet of
File:
D:\ARM Project\LPC2214\Schematics\LPC2214.DSN
Drawn By:
ETT CO., LTD.



Title	Power Supply for ET-ARM7 LPC2214 (ETT CO., LTD.)		
Size: A4	Number: WWW.ETT.CO.TH		Revision: 1.0
Date: 19-May-2006		Sheet of	
File: D:\ARM Project\LPC2214\Schematics\LPC2214.DDB		Drawn By:	ETT CO., LTD.